

10/573962

251149 SEQLIST
SEQUENCE LISTING

AP201001PCTPT0 29 MAR 2006

<110> GOVERNMENT OF THE UNITED STATES OF AMERICA, REPRESENTED BY
THE SECRETARY, DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIMITROV, Dimiter S.
ZHANG, Mei-Yun

<120> IMMUNOGLOBULINS WITH POTENT AND BROAD ANTIVIRAL ACTIVITY

<130> 251149

<150> US 60/506,946

<151> 2003-09-29

<150> PCT/US04/31878

<151> 2004-09-29

<160> 19

<170> PatentIn version 3.3

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35 40 45

Gly Ala Ser Thr Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser Gly Ser
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Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Gly Arg Leu Glu Pro Glu
65 70 75 80

Asp Leu Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Thr Ser Pro Tyr Thr
85 90 95

Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr Gly Gly Gly Gly
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Ser Gly Gly Gly Ala Ser Gly Gly Gly Gly Ser Val Arg Leu Leu Glu
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251149 SEQLIST

Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser Ser Val Gln Val Ser
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Cys Lys Ala Ser Gly Gly Thr Phe Ser Met Tyr Gly Val Asn Trp Val
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Arg Gln Ala Pro Gly His Gly Leu Glu Trp Met Gly Gly Ile Ile Pro
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Ile Phe Gly Thr Ser Asn Tyr Ala Gln Lys Phe Arg Gly Arg Val Thr
180 185 190

Phe Thr Ala Asp Gln Ala Thr Ser Thr Ala Tyr Met Glu Leu Thr Asn
195 200 205

Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys Ala Arg Asp Phe Gly
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Gly Ala Ser Thr Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser Gly Ser
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Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Gly Arg Leu Glu Pro Glu
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Asp Leu Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Thr Ser Pro Tyr Thr
Page 2

251149 SEQLIST
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Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr Gly Gly Gly Gly
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Ser Gly Gly Gly Gly Ser Gly Gly Gly Ser Val Gln Leu Leu Glu
115 120 125

Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser Ser Val Gln Val Ser
130 135 140

Cys Lys Ala Phe Gly Gly Thr Phe Ser Met Tyr Gly Phe Asn Trp Val
145 150 155 160

Arg Gln Ala Pro Gly His Gly Leu Glu Trp Met Gly Gly Ile Ile Pro
165 170 175

Ile Phe Gly Thr Thr Asn Tyr Ala Gln Lys Phe Arg Gly Arg Val Thr
180 185 190

Phe Thr Ala Asp Gln Ala Thr Ser Thr Ala Tyr Met Glu Leu Thr Asn
195 200 205

Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys Ala Arg Asp Phe Gly
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Gln Tyr Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His
 65 70 75 80

Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys
 85 90 95

Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln
 100 105 110

Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Asp Glu Leu
 115 120 125

Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro
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251149 SEQLIST
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Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn
145 150 155 160

Tyr Lys Thr Thr Pro Val Leu Asp Ser Asp Gly Ser Phe Phe Leu
165 170 175

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Gly Ala Ser Thr Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser Gly Ser
50 55 60

Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Gly Arg Leu Glu Pro Glu
65 70 75 80

Asp Leu Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Thr Ser Pro Tyr Thr
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Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr Gly Gly Gly Gly
100 105 110

Ser Gly Gly Gly Ala Ser Gly Gly Gly Ser Val Arg Leu Leu Glu
115 120 125

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Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser Ser Val Gln Val Ser
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Arg Gln Ala Pro Gly His Gly Leu Glu Trp Met Gly Gly Ile Ile Pro
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Ile Phe Gly Thr Ser Asn Tyr Ala Gln Lys Phe Arg Gly Arg Val Thr
180 185 190

Phe Thr Ala Asp Gln Ala Thr Ser Thr Ala Tyr Met Glu Leu Thr Asn
195 200 205

Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys Ala Arg Asp Phe Gly
210 215 220

Pro Asp Trp Glu Asp Gly Asp Ser Tyr Asp Gly Ser Gly Arg Gly Phe
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Phe Asp Phe Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Pro Asp
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Pro Glu Glu Pro Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys
260 265 270

Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro
275 280 285

Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys
290 295 300

Val Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp
305 310 315 320

Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu
325 330 335

Glu Gln Tyr Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu
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His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn
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Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly

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Leu Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr
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Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn
420 425 430

Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe
435 440 445

Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn
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Gly Ala Ser Thr Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser Gly Ser
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Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Gly Arg Leu Glu Pro Glu
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Asp Leu Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Thr Ser Pro Tyr Thr
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 Cys Lys Ala Ser Gly Gly Thr Phe Ser Met Tyr Gly Val Asn Trp Val
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 Arg Gln Ala Pro Gly His Gly Leu Glu Trp Met Gly Gly Ile Ile Pro
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 Ile Phe Gly Thr Ser Asn Tyr Ala Gln Lys Phe Arg Gly Arg Val Thr
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 Phe Thr Ala Asp Gln Ala Thr Ser Thr Ala Tyr Met Glu Leu Thr Asn
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 Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys Ala Arg Asp Phe Gly
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 Pro Asp Trp Glu Asp Gly Asp Ser Tyr Asp Gly Ser Gly Arg Gly Phe
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 Phe Asp Phe Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Glu Pro
 245 250 255
 Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys Pro Pro Asp Pro
 260 265 270
 Glu Glu Pro Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys Pro
 275 280 285
 Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys
 290 295 300
 Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val
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 Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr
 325 330 335
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251149 SEQLIST

340 345 350

Gln Tyr Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His
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Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys
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Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln
385 390 395 400

Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Asp Glu Leu
405 410 415

Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro
420 425 430

Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn
435 440 445

Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe Leu
450 455 460

Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn Val
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35 40 45

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 Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Gly Arg Leu Glu Pro Glu
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 Asp Leu Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Thr Ser Pro Tyr Thr
 85 90 95
 Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr Gly Gly Gly Gly
 100 105 110
 Ser Gly Gly Gly Gly Ser Gly Gly Gly Ser Val Gln Leu Leu Glu
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 Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser Ser Val Gln Val Ser
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 Cys Lys Ala Phe Gly Gly Thr Phe Ser Met Tyr Gly Phe Asn Trp Val
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 Arg Gln Ala Pro Gly His Gly Leu Glu Trp Met Gly Gly Ile Ile Pro
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 Ile Phe Gly Thr Thr Asn Tyr Ala Gln Lys Phe Arg Gly Arg Val Thr
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 Phe Thr Ala Asp Gln Ala Thr Ser Thr Ala Tyr Met Glu Leu Thr Asn
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 Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys Ala Arg Asp Phe Gly
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 Pro Asp Trp Glu Gly Gly Asp Ser Tyr Asp Gly Ser Gly Arg Gly Phe
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 Pro Glu Glu Pro Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys
 260 265 270
 Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro
 275 280 285
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251149 SEQLIST
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Val Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp
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Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu
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Glu Gln Tyr Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu
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His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn
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Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly
370 375 380

Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Asp Glu
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Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn
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Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe
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Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Gly Arg Leu Glu Pro Glu
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Ile Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr Gly Gly Gly Gly
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115 120 125

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Cys Lys Ala Ser Gly Gly Thr Phe Ser Met Tyr Gly Phe Asn Trp Val
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Arg Gln Ala Pro Gly His Gly Leu Glu Trp Met Gly Gly Ile Ile Pro
165 170 175

Ile Phe Gly Thr Thr Asn Tyr Ala Gln Lys Phe Arg Gly Arg Val Thr
180 185 190

Phe Thr Ala Asp Gln Ala Thr Ser Thr Ala Tyr Met Glu Leu Thr Asn
195 200 205

Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys Ala Arg Asp Phe Gly
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Pro Asp Trp Glu Gly Gly Asp Ser Tyr Asp Gly Ser Gly Arg Gly Phe
225 230 235 240

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245 250 255

Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys Pro Pro Asp Pro
Page 12

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260
 Glu Glu Pro Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys Pro
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 Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val
 305 310 315 320
 Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr
 325 330 335
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 Gln Tyr Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His
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 Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln
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 Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Asp Glu Leu
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 Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro
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 Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn
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Gly Ala Ser Thr Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser Gly Ser
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Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Gly Arg Leu Glu Pro Glu
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Asp Leu Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Thr Ser Pro Tyr Thr
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Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr Gly Gly Gly Gly
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Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Val Gln Leu Leu Glu
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Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser Ser Val Gln Val Ser
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Cys Lys Ala Ser Gly Gly Thr Phe Ser Met Tyr Gly Phe Asn Trp Val
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Arg Gln Ala Pro Gly His Gly Leu Glu Trp Met Gly Gly Ile Ile Pro
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Ile Phe Gly Thr Ser Asn Tyr Ala Gln Lys Phe Arg Gly Arg Val Thr
 180 185 190

Phe Thr Ala Asp Gln Ala Thr Ser Thr Ala Tyr Met Glu Leu Thr Asn
 195 200 205

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Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu Pro Glu
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85 90 95

Phe Phe Gly Pro Gly Thr Thr Val Asp Met Lys Arg Gly Gly Gly Gly
100 105 110

Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Val Gln Leu Leu Glu
115 120 125

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145 150 155 160

Ile Arg Gln Ser Pro Ser Arg Gly Leu Glu Trp Leu Gly Arg Thr Tyr
165 170 175

251149 SEQLIST

Tyr Arg Ser Thr Trp Phe Tyr Asp Tyr Ala Glu Ser Val Lys Ser Arg
180 185 190

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195 200 205

Arg Ser Val Thr Pro Glu Asp Thr Ala Val Tyr Tyr Cys Ala Arg Asp
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Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu Pro Glu
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85 90 95

Gly Gln Gly Thr Lys Val Glu Leu Lys Arg Gly Gly Gly Gly Ser Gly
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Gly Gly Gly Ser Gly Gly Gly Gly Ser Val Gln Leu Leu Glu Ser Gly
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Gly Asn Thr Tyr Tyr Asn Pro Ser Leu Thr Ser Arg Val Val Ile Ser
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Thr Leu Val Thr Val Ser Ser
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Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly Ser Gly Ser
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Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp Phe
 65 70 75 80

251149 SEQLIST

Ala Thr Tyr Tyr Cys Gln Gln Ala Asn Ser Phe Pro Leu Thr Phe Gly
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Gly Gly Thr Lys Val Glu Ile Lys Arg Gly Gly Gly Gly Ser Gly Gly
100 105 110

Gly Gly Ser Gly Gly Gly Gly Ser Val Gln Leu Leu Glu Ser Gly Ala
115 120 125

Glu Val Lys Arg Pro Gly Ser Ser Val Arg Val Ser Cys Gln Val Ser
130 135 140

Gly Gly Ser Phe Ser Asn Tyr Ala Val Ser Trp Val Arg Gln Thr Pro
145 150 155 160

Gly His Gly Leu Glu Trp Met Gly Gly Ile Ile Pro Met Phe Asn Ala
165 170 175

Pro Asn Tyr Ala Gln Lys Phe His Gly Arg Val Thr Phe Ile Ala Asp
180 185 190

Glu Ser Thr Arg Thr Val His Met Glu Leu Arg Ser Leu Arg Ser Glu
195 200 205

Asp Thr Ala Val Tyr Phe Cys Ala Thr Ala Ser Glu Ala Thr Glu Asn
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251149 SEQLIST

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Ala Ser Thr Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly Ser Gly
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Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Gly Leu Gln Pro Glu Asp
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Phe Ala Thr Tyr Tyr Cys Gln His Leu Lys Arg Tyr Pro Tyr Thr Phe
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Gly Gln Gly Thr Lys Leu Glu Ile Ser Arg Gly Gly Gly Gly Ser Gly
100 105 110

Gly Gly Gly Ser Gly Gly Gly Gly Ser Val Gln Leu Leu Glu Ser Gly
115 120 125

Pro Gly Val Val Lys Pro Ser Glu Thr Leu Ser Leu Thr Cys Thr Val
130 135 140

Ser Gly Ala Ser Val Asn Asn Tyr Tyr Trp Thr Trp Val Arg Gln Pro
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Pro Gly Lys Gly Leu Glu Trp Ile Gly Asn Val Tyr Asp Ser Gly Asp
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Thr Asn Tyr Asn Pro Ser Leu Ser Ser Arg Leu Ser Leu Ser Met Asp
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Thr Ser Lys Asn Gln Phe Ser Leu Arg Leu Ser Ser Val Thr Ala Ala
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Asp Thr Ala Thr Tyr Tyr Cys Ala Arg Tyr His Arg His Phe Ile Arg
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Ser Ser

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 Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu Pro Glu
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 Asp Phe Ala Val Tyr Tyr Cys Gln Asn Gln Gly Phe Ser Pro Arg Phe
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 Phe Phe Gly Pro Gly Thr Thr Val Asp Met Lys Arg Gly Gly Gly Gly
 100 105 110
 Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Val Gln Leu Leu Glu
 115 120 125
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 Ala Ile Ser Gly Asp Ser Leu Ser Ser Asp Ser Thr Ala Trp Asn Trp
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 Ile Arg Gln Ser Pro Ser Arg Gly Leu Glu Trp Leu Gly Arg Thr Tyr
 165 170 175
 Tyr Arg Ser Thr Trp Phe Tyr Asp Tyr Ala Glu Ser Val Lys Ser Arg
 180 185 190
 Ile Asn Ile Asn Pro Asp Thr Ser Lys Ser Gln Phe Ser Leu Gln Leu
 195 200 205
 Arg Ser Val Thr Pro Glu Asp Thr Ala Val Tyr Tyr Cys Ala Arg Asp
 210 215 220
 Phe Asn Lys Gly Ala Gly Tyr Asn Trp Phe Asp Pro Trp Gly Pro Gly
 225 230 235 240
 Thr Val Val Thr Val Ser Ser Pro Asp Pro Glu Glu Pro Lys Ser Cys

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250

245

255

Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly
260 265 270

Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met
275 280 285

Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser His
290 295 300

Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Val Glu Val
305 310 315 320

His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn Ser Thr Tyr
325 330 335

Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly
340 345 350

Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile
355 360 365

Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val
370 375 380

Tyr Thr Leu Pro Pro Ser Arg Asp Glu Leu Thr Lys Asn Gln Val Ser
385 390 395 400

Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu
405 410 415

Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro
420 425 430

Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val
435 440 445

Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met
450 455 460

His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser
465 470 475 480

Pro Gly

251149 SEQLIST

<210> 16
 <211> 482
 <212> PRT
 <213> Artificial

<220>
 <223> Synthetic

<400> 16

Glu Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly Glu Arg
 1 5 10 15

Ala Thr Leu Ser Cys Arg Ala Ser His Ser Val Ser Arg Ala Tyr Leu
 20 25 30

Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile Tyr
 35 40 45

Gly Thr Ser Ser Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser Gly Ser
 50 55 60

Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu Pro Glu
 65 70 75 80

Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Gly Ser Pro Trp Phe
 85 90 95

Gly Gln Gly Thr Lys Val Glu Leu Lys Arg Gly Gly Gly Gly Ser Gly
 100 105 110

Gly Gly Gly Ser Gly Gly Gly Gly Ser Val Gln Leu Leu Glu Ser Gly
 115 120 125

Pro Gly Leu Val Lys Pro Ser Gln Thr Leu Ser Leu Thr Cys Thr Val
 130 135 140

Ser Gly Gly Ser Ile Ser Thr Gly Asp Tyr Tyr Trp Ser Trp Ile Arg
 145 150 155 160

Gln Ser Pro Gly Lys Gly Leu Glu Trp Ile Gly Tyr Ile Ser Ser Ser
 165 170 175

Gly Asn Thr Tyr Tyr Asn Pro Ser Leu Thr Ser Arg Val Val Ile Ser
 180 185 190

Phe Asp Thr Ser Met Asn Gln Phe Ser Leu Lys Val Asp Ser Val Thr
 195 200 205

Ala Ala Asp Thr Ala Val Tyr Tyr Cys Ala Arg Glu Arg Arg Val Leu
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251149 SEQLIST
220

210

215

Leu Trp Leu Gly Phe Pro Arg Gly Gly Leu Asp Tyr Trp Gly Gln Gly
225 230 235 240

Thr Leu Val Thr Val Ser Ser Pro Asp Pro Glu Glu Pro Lys Ser Cys
245 250 255

Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly
260 265 270

Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met
275 280 285

Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser His
290 295 300

Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Val Glu Val
305 310 315 320

His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn Ser Thr Tyr
325 330 335

Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly
340 345 350

Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile
355 360 365

Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val
370 375 380

Tyr Thr Leu Pro Pro Ser Arg Asp Glu Leu Thr Lys Asn Gln Val Ser
385 390 395 400

Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu
405 410 415

Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro
420 425 430

Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val
435 440 445

Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met
450 455 460

251149 SEQLIST

His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser
 465 470 475 480

Pro Gly

<210> 17
 <211> 485
 <212> PRT
 <213> Artificial

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 <223> synthetic

<400> 17

Met Thr Gln Ser Pro Ser Ser Val Ser Ala Ser Val Gly Asp Arg Val
 1 5 10 15

Thr Ile Thr Cys Arg Ala Ser Gln Gly Ile Ser Ser Trp Leu Ala Trp
 20 25 30

Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile Asn Ala Ala
 35 40 45

Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly Ser Gly Ser
 50 55 60

Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp Phe
 65 70 75 80

Ala Thr Tyr Tyr Cys Gln Gln Ala Asn Ser Phe Pro Leu Thr Phe Gly
 85 90 95

Gly Gly Thr Lys Val Glu Ile Lys Arg Gly Gly Gly Gly Ser Gly Gly
 100 105 110

Gly Gly Ser Gly Gly Gly Gly Ser Val Gln Leu Leu Glu Ser Gly Ala
 115 120 125

Glu Val Lys Arg Pro Gly Ser Ser Val Arg Val Ser Cys Gln Val Ser
 130 135 140

Gly Gly Ser Phe Ser Asn Tyr Ala Val Ser Trp Val Arg Gln Thr Pro
 145 150 155 160

Gly His Gly Leu Glu Trp Met Gly Gly Ile Ile Pro Met Phe Asn Ala
 165 170 175

Pro Asn Tyr Ala Gln Lys Phe His Gly Arg Val Thr Phe Ile Ala Asp
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251149 SEQLIST

180

185

190

Glu Ser Thr Arg Thr Val His Met Glu Leu Arg Ser Leu Arg Ser Glu
 195 200 205
 Asp Thr Ala Val Tyr Phe Cys Ala Thr Ala Ser Glu Ala Thr Glu Asn
 210 215 220
 Asp Tyr Tyr Gln Ser Pro Thr His Tyr Tyr Ala Met Asp Val Trp Gly
 225 230 235 240
 Gln Gly Thr Ala Val Thr Val Phe Ser Ser Pro Asp Pro Glu Glu Pro
 245 250 255
 Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu
 260 265 270
 Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp
 275 280 285
 Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp
 290 295 300
 Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly
 305 310 315 320
 Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn
 325 330 335
 Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp
 340 345 350
 Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu Pro
 355 360 365
 Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu
 370 375 380
 Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Asp Glu Leu Thr Lys Asn
 385 390 395 400
 Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile
 405 410 415
 Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr
 420 425 430

251149 SEQLIST

Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys
 435 440 445

Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys
 450 455 460

Ser Val Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu
 465 470 475 480

Ser Leu Ser Pro Gly
 485

<210> 18
 <211> 477
 <212> PRT
 <213> Artificial

<220>
 <223> Synthetic

<400> 18

Gln Met Thr Gln Ser Pro Ser Phe Leu Ser Ala Ser Val Gly Asp Arg
 1 5 10 15

Val Ser Ile Thr Cys Arg Ala Ser Gln Asp Ile Gln Lys Phe Leu Ala
 20 25 30

Trp Tyr Gln Leu Thr Pro Gly Asp Ala Pro Lys Leu Leu Met Tyr Ser
 35 40 45

Ala Ser Thr Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly Ser Gly
 50 55 60

Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Gly Leu Gln Pro Glu Asp
 65 70 75 80

Phe Ala Thr Tyr Tyr Cys Gln His Leu Lys Arg Tyr Pro Tyr Thr Phe
 85 90 95

Gly Gln Gly Thr Lys Leu Glu Ile Ser Arg Gly Gly Gly Gly Ser Gly
 100 105 110

Gly Gly Gly Ser Gly Gly Gly Gly Ser Val Gln Leu Leu Glu Ser Gly
 115 120 125

Pro Gly Val Val Lys Pro Ser Glu Thr Leu Ser Leu Thr Cys Thr Val
 130 135 140

Ser Gly Ala Ser Val Asn Asn Tyr Tyr Trp Thr Trp Val Arg Gln Pro
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145 150 155 160

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251149 SEQLIST

Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly
405 410 415

Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp
420 425 430

Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp
435 440 445

Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu His
450 455 460

Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly
465 470 475

<210> 19
<211> 24
<212> PRT
<213> Artificial

<220>
<223> Synthetic

<400> 19

Met Pro Met Gly Ser Leu Gln Pro Leu Ala Thr Leu Tyr Leu Leu Gly
1 5 10 15

Met Leu Val Ala Ser Val Leu Ala
20